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LXXXVI. *Observations for proving the Going of Mr. Ellicott's Clock, at St. Helena; by Mr. Charles Mason.*

Read May 6,

1762.

IN my return from the cape of Good Hope, the clock, used in the observations made there, was set going at James's fort, St. Helena, the pendulum remaining as at the Cape. Here I found myself at a great loss, to get observations to prove its motion, the heavens being almost perpetually covered with clouds. At length, considering, that the place being situated in such a narrow deep valley, if the times of the descent of the stars, over the western ridge of rocks, (the altitude of whose nearest summit was about 30° , and distant about a quarter of a mile, at the observatory) were observed, it would give the time per clock, in a sidereal day; and the chances for such observations would be greater, than by any other method, as they might be continued the whole night. Accordingly, I began to observe, by fixing the eye to a point: but this was soon improved, by the Reverend Mr. Maskelyne, by making the stars descend each night, in the same part of the telescope of the equal altitude instrument: and it was very beautiful to see, how instantaneously they disappeared.

The difference of the effect of gravity at the two places, on the going of the clock, may be seen, by comparing the following with the observations made at the Cape.

1761.

1761.	Time per clock.	Observations of the same letter to be compared together.	From the mean of the observations, the clock loses of fiderial time per day.	
Octob.	h ' "			"
h 31.	21 48 58 -	Star - - a		
	22 2 42 +	* - - c		
Nov.			57.0	
24 5.	21 44 12	Star - - a		
	21 57 57½	* - - c		
2 6.	22 10 34	* - - e		
	50 44 +	- - - f		
	54 8 +	- - - g		
	23 0 4½	- - - h		
	4 50	- - - i		
			57.3	
8.	22 8 26	* - - e		
	12 8	- - - p		
	48 49 +	- - - f		
	52 14 -	- - - g		
			57.3	
9.	22 11 10½	* - - p		
	47 52	- - - f		
	51 16 +	- - - g		
	57 12½	- - - h		
	23 1 57	- - - i		
			57.3	
8 10.	22 20 3 +	* - - r		
	46 55 -	- - - f		
	50 19	- - - g		
	56 14½	- - - h		
	23 1 0	- - - i		
			57.7	
15.	22 15 15 -	* - - r		
	42 6	- - - f		
	42 30 +	- - - g		
	56 11 -	- - - i		
			57.4	

Stars of the first, second, or third magnitude, descended the hill, or rather the ridge of a keen extensive rock, that forms one side of the valley.

Per Mr. Maskelyne.

Stars descended.

Per Mr. Maskelyne.

1761.	Time per clock.	Observations of the same letter to be compared together.	From the mean of the observations, the clock loses of fiderial time per day.
Nov.	h / "		"
16.	22 41 8 +	Star - - <i>f</i>	57.5
	44 33 -	- - - <i>g</i>	
	50 29 -	- - - <i>b</i>	
	55 14 -	- - - <i>i</i>	
19.	22 41 40 +	* - - <i>g</i>	57.5
	47 36 $\frac{1}{2}$	- - - <i>b</i>	
	52 21 $\frac{1}{2}$	- - - <i>i</i>	
Dec.			
3.	23 45 44	* - - <i>a</i>	59.4
	50 44 $\frac{1}{2}$	- - - <i>b</i>	
	51 10 -	- - - <i>c</i>	
	52 19	- - - <i>d</i>	
	53 42	- - - <i>e</i>	
5.	23 51 43 +	* - - <i>e</i>	59.4
6.	23 42 47 -	* - - <i>a</i>	59.1
	47 47	- - - <i>b</i>	
	48 12 +	- - - <i>c</i>	
	49 22	- - - <i>d</i>	
	50 44 +	- - - <i>e</i>	
9.	This day I difcovered the wedges behind the clock, which was put to make it ftand perpendicular, were loofe; fhunk, I fuppose, by the drynefs of the place. Quære, If this was not the caufe of the above difference. The wedges being again fecured,		
13.	o 17 5 :	* - - <i>g</i>	58.5
	26 16	- - - <i>i</i>	
15.	o 15 7 :	* - - <i>g</i>	58.5
	24 20	- - - <i>i</i>	
			59.0

} These are a fet of different ftars, the others defcending in the daylight.

} These are different ftars.
Per Mr. Maskelyne.

} These are a set of different stars, the others descending in the daylight.

} These are different stars.
Per Mr. Maskelyne.

1761.	Time per clock.	Observations of the same letter to be compared together.	From the mean of the observations, the clock loses of fiderial time per day.
Dec.	h ' "		"
♄ 16.	0 21 47 — : 23 21 24 46	Star - - γ - - - i - - - k	58.85
♃ 17.	0 20 47 + 22 22 23 47 +	* - - γ - - - i - - - k	
♂ 19.	0 49 31 55 21 + I 2 56 $\frac{1}{2}$ I 9 14 $\frac{1}{2}$	* - - l - - - m - - - n - - - o	58.4
♂ 20.	0 48 33 54 23 + I 1 58 8 15 $\frac{1}{2}$	* - - l - - - m - - - n - - - o	59.0
♂ 22.	0 46 35 + 52 25 — I 6 18 —	* - - l - - - m - - - o	

} Per Mr. Maskelyne.

1762.
Jan.

- ♄ 5. The clock was stopped, and an arch put on, to shew the degrees and minutes the pendulum vibrates.
- ♄ 6. The apparent zenith distance of Aldebaran upon the meridian = $31^{\circ} 55' 20''$.

♂ 9.	I 49 55 52 31 + 55 27 + 2 8 28 6 42 0	* - - p Archarnar q - - - r - - - β - - - -	58.4
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} The pendulum vibrates $2^{\circ} 37'$ on each side of the perpendicular.

[538]

1762.	Time per clock.	Observations of the same letter to be compared together.	From the mean of the observations, the clock loses of fiderial time per day.	
Jan.	h m s			
○ 10.	1 48 56	Star - - p		
	51 32 $\frac{1}{2}$	Archarnar q		
	54 29 $\frac{1}{2}$	- - - r		
	2 7 30	- - - β		
	5 18 0	- - - -		Vibration 2 34 0
▷ 11.	4 56 0	- - - -		Ditto - 2 34 0
♂ 12.	14 47 0	- - - -		Ditto - 2 55 0
	2 45 53	- - - δ		Per Mr. Maskelyne.
♂ 13.	16 20 0	- - - -	59.0	Vibration 2 54 0
	2 44 54	* - - δ		
	3 40 36 :	- - - u		
	44 42 +	- - - z		
			59.1	
24 14.	16 39 0	- - - -		Ditto - 2 59 0
	3 39 37	* - - μ		
	43 43	- - - z		
	51 35 +	- - - γ		
	4 23 47	- - - α		
♀ 15.	16 11 0	- - - -	58.6	Ditto - 2 58 0
h 16.	3 9 5 -	* - - s		
	16 33 -	- - - t		
	37 40 +	- - - u		
	41 46 +	- - - z		
	49 38	- - - γ		
	4 21 50	- - - α		
				Per Mr. Maskelyne.
○ 17.	15 38 0	- - - -		Vibration 2 53 0
▷ 18.	1 57 0	- - - -	58.9	Ditto - 2 55 0

1762.

1762.	Time per clock.	Observations of the same letter to be compared together.	From the mean of the observations, the clock loses of fiderial time per day.	
Jan.	h / "		"	• ' "
♂ 19.	1 59 0	- - - -		Vibration 2 58 0
♀ 20.	3 2 0	- - - -		Ditto - 3 4 0
24 21.	2 36 5	Star - - x		
	3 4 10	- - - s		
	11 38½ :	- - - t		
	32 46	- - - u		
	4 1 14	- - - w		
	4 40 0	- - - -		Ditto - 3 2 0
♀ 22.	2 35 6 +	* - - x	59.0	
	3 3 11 -	- - - s		
	10 39½	- - - t		
	31 47 +	- - - u		
	4 0 15	- - - w		
	15 57 -	- - - a		
	4 50 0	- - - -		Ditto - 3 3 0
h 23.	The clock taken down, and the pendulum secured, as at the cape of Good Hope, after the direction given per Mr. Ellicott the maker.			
	<p>From the mean of a great number of observations, taken at different times of the day and night, Farenheit's thermometer stood at - - - -</p> <p>The thermometer was hung by the side of the clock, and I never saw it higher (from 12th of November 1761 to January 18th, 1762) than 74½, or lower than 67.</p>			
	<p>in { November 68.7 } from 12th { December 70.3 } to { January 72.3 } the 18th.</p>			

Those observations marked : are a little dubious.

Charles Mafon.